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Notes on the Moths of the *Amphipyra pyramidea* Complex (Lepidoptera, Noctuidae) in Japan, with Description of a New Species[1)]

By

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大和田　守*：日本産シマカラスヨトウ種群（チョウ目，ヤガ科）に関するノートと１新種の記載

Members of the genus *Amphipyra* are medium- to large-sized moths and mainly distributed in the Palearctic Region, and include some closely related species which are rather difficult to discriminate by external and even genitalic characters. FLETCHER (1968) divided the European species of the *A. pyramidea* complex into two species, that is, *A. pyramidea* (LINNAEUS, 1758) and *A. berbera* RUNGUS, 1949, the latter of which had originally been described from Morocco as a subspecies of the former species and is widely distributed in Europe. In the southern central and eastern parts of the Palearctic Region, the *A. pyramidea* complex includes two species, *A. pyramidea* and *A. monolitha* (GUENÉE, 1852).

In Japan and the neighboring countries, *A. pyramidea* is distributed in the cold temperate zone and considered to be the subspecies *obscura* OBERTHÜR, 1880, and *A. monolitha* occurs in the warm temperate zone and is regarded as the subspecies *surnia* FELDER et ROGENHOFER, 1874 (FLETCHER, 1968; SUGI, 1982). They are very similar to each other in the genitalic characters, but can be separable in the size and wing maculation, though sometimes confused. Examining the male genitalia, SWINHOE (1918) pointed out the difference in the uncus of English *pyramidea* and Japanese *surnia* in the figures 12 and 13a by arrows, and described a new species, *A. yama*, from Asama Yama [sic] = Mt. Asama-yama, central Honshu, which was synonymized with *A. pyramidea obscura* by SUGI (1982). Although OGATA (1958) considered that *A. pyramidea* and *A. monolitha* are separable by the size and number of cornuti in the aedeagus, SUGI (1982) only stressed the shape of uncus (the same part of SWINHOE's arrow) as the diagnostic character separating the two species. FUNAKOSHI (1984) attempted to separate them by the numerical characters in 120 specimens from Gifu Prefecture, central Honshu, and also concluded that there was no feature which clearly separated them except the shape of uncus, though a few intermediate specimens were found.

In the late autumn of 1987, I made a short collecting trip to Amami-ôhima Island, the central Ryukyus, as a part of the Natural History Research Project of the Japanese Islands by the National

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Science Museum, Tokyo, and obtained two *Amphipyra* moths, one male of "*A. livida*" and a long series of "*A. monolitha*". The island is the southern limit of their distribution in Japan. At first sight, these moths looked a little different from those in the main islands of Japan, and therefore I examined them closely. To my surprise, the male of "*A. livida*" was clearly differentiated by the genitalic features from true *A. livida* ([DENIS et SCHIFFERMÜLLER, 1775]), which is widely distributed from Europe to Japan. I was described it under the name of *A. sublivida* (OWADA, 1988).

The male genitalia of "*A. monolitha*" from Amami-ôshima Island were almost identical with those of "*A. monolitha surnia*" from Honshu, Japan, but I had some impression that they are different in their maculation. In the course of a comparative study of specimens from various places of Japan, I found that the black and white stripes at the lateral sides of abdomen are absent in all the specimens from Amami-ôshima Is., and that such moths are collected not only on Amami-ôshima Is. but also almost all the places where "*A. monolitha*" were collected. As was described by HAMPSON (1908), the abdomen of *A. pyramidea*, sensu HAMPSON, 1908, a mixture of *A. pyramidea*, *A. monolitha*, *A. berbera* and *A. strigata* FLETCHER, 1968, has "the sides black-brown with pale bars". I separated these two forms strictly, and was unable to find intermediate specimens between them. In the female genitalia, I was able to discriminate three types which accorded with *A. pyramidea* and the two forms of "*A. monolitha*", though no one had previously pointed out the difference of the female genitalia in the *A. pyramidea* complex species of eastern Asia. In the male genitalia, however, I failed to find diagnostic features which are useful for separating the two forms of "*A. monolitha*". Recently FUNAKOSHI (1994) pointed out that there were two forms in larvae of "*A. monolitha*".

In the spring of 1990, I had an opportunity to visit the Natural History Museum, London, and examined the type specimens of the Asian species of the *A. pyramidea* complex, that is, *A. monolitha*, *A. obscura*, *A. surnia* and *A. yama*. In addition to these, two nominal taxa remain in eastern Asia, *A. monolitha apyra* BRYK, 1942, from the Kuriles, and *A. pyramidea* var. *obliquilimbata* GRAESER, [1889], from Amurland, Southeast Siberia, but their type localities are not included in the range of "*A. monolitha*". Judging from those type specimens and facts, I came to the conclusion that the form without the black and white stripes at the lateral sides of abdomen was new to science. In the summer of 1995 I made a collecting trip to Fukushima Prefecture, northeastern Honshu, which lies almost at the northern limit of the distributional range of "*A. monolitha*", and succeeded in collecting *A. pyramidea* and true *A. monolitha* but failed to collect the new species. Taking this opportunity, I will describe the new species with notes on the diagnostic features and the distributional trend of the *A. pyramidea* complex in Japan, and will give notes on the subspecies classification of *A. pyramidea*.

Amphipyra horiei sp. nov.

(Figs. 4, 7, 11–13)

Male and female. Length of forewing: 26–32 mm. Antenna simple.

Head and thorax reddish brown, heavily mixed with black scales. Abdomen greyish brown on the upperside, underside ochreous brown in basal half, blackish brown distally, lateral sides blackish brown, without black and white segmental stripes.

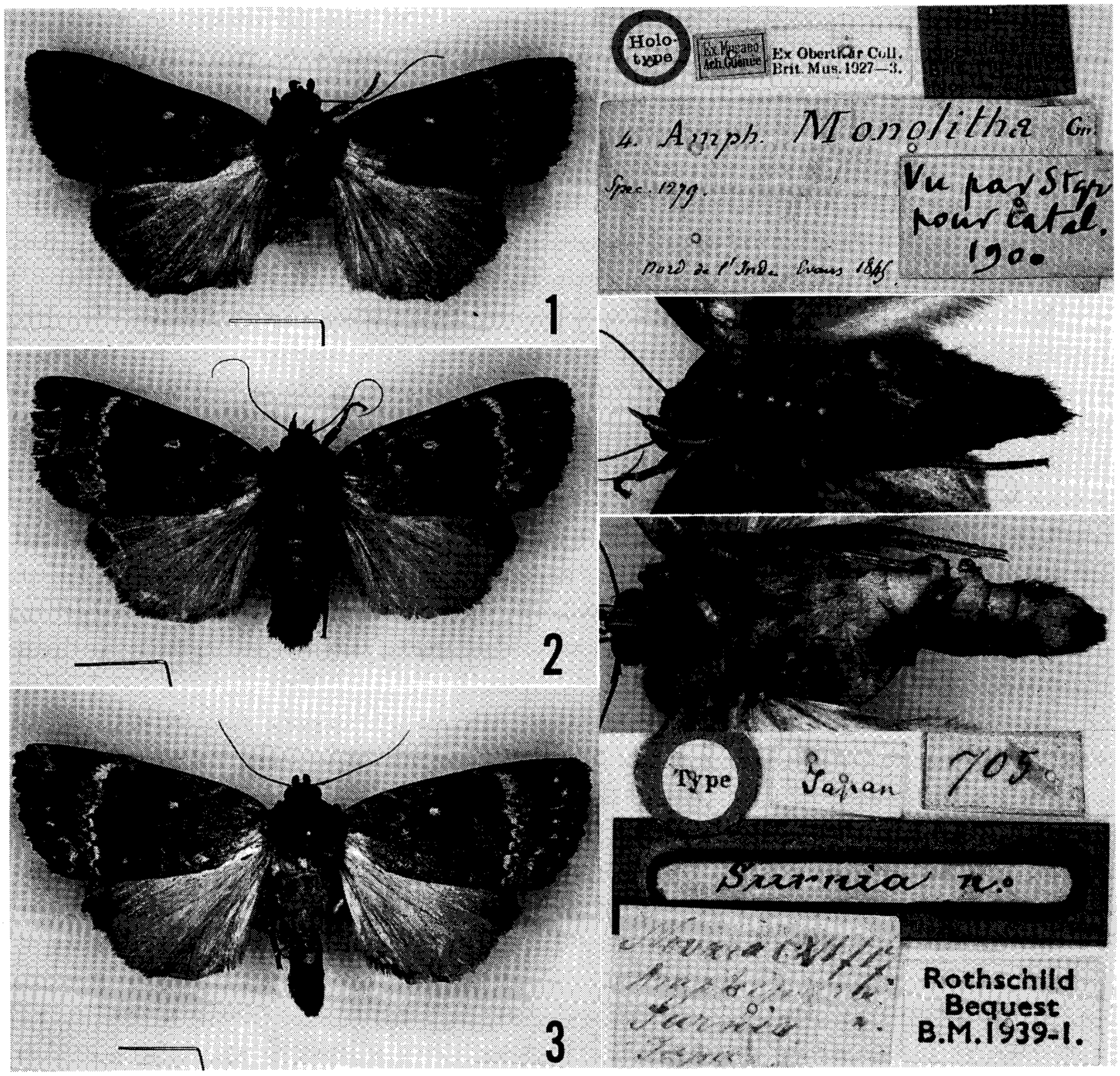
On the upperside of forewing, ground colour dark reddish brown, mixed with blackish scales; subbasal line black, double, the inner line broader, antemedial line of black double lines, markedly dentate, the outer line broader, orbicular stigma of a black ovate circle filled with ochreous silver, with a very minute black point at centre in a few specimens, blackish shade on cross vein, arising from orbicular stigma to postmedial line, postmedial line double filled with ochreous silver, waved, the inner line black, the outer line dull greyish brown, edged externally by ochreous silver shade, subterminal line indistinct, traceable by pale shade in costa and dorsum, respectively, cilia as in the ground colour, with a series of ochreous silver dots. Upperside of hindwing cupreous reddish brown, costal area dark reddish brown, with pale costal margin. Underside of wings greyish red brown, mixed with pale ochreous scales, tinged with cupreous reddish brown in anal half of hindwing, postmedial lines dull dark brown, almost straight in forewing, smoothly curved in hindwing, dark brownish discocellular mark conspicuous in hindwing.

Male genitalia. Uncus well developed, apex pointed, distal portion swollen dorsally. Tegumen moderate. Vinculum V-shaped. Valva simple, almost parallel-sided, slightly curved and tapered in apical portion. Aedeagus with a series of 7–17 long tapered cornuti and of 7–28 short thorn-like cornuti.

Female genitalia. Papillae anales and 8th abdominal segment bearing rather long setae which are present in the membrane around the sclerotized lamella postvaginalis. In virgin individual, bursa copulatrix with many furrows, neck rather long and slender, right side of bursa smoothly rounded, left side of bursa nearly straight, a little collapsed at middle from which ductus seminalis arise, bottom of bursa tapered; in fully expanded bursa copulatrix, the furrows disappeared, bursa rather long ovate, right side smoothly rounded, left side almost straight, ductus seminalis arising from the middle of left side.

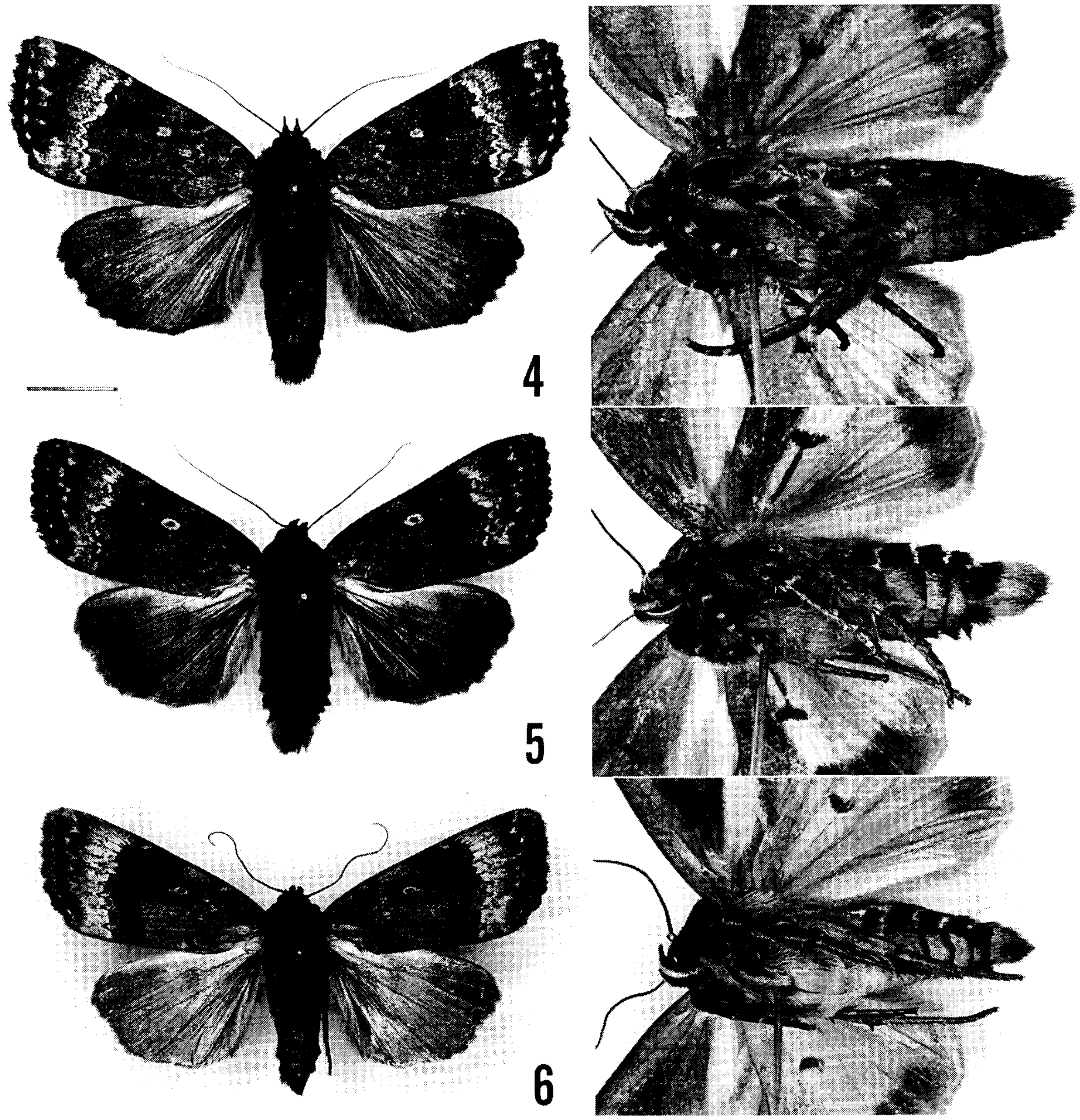
Type series. Holotype, female, Japan, Mie Pref., Miyama, Chôshigawa Riv., 150 m in alt., 29. VIII. 1992, Mamoru OWADA leg., preserved in the National Science Museum, Tokyo.

Paratypes: 72♂46♀. Tokyo: Ôta-ku, Den-enchôfu, 1♂, 4. VIII. 1954, 1♂, 5. X. 1954, Y. KUROSAWA leg.; Ôta-ku, Ômori, 1♀, 26. VII. 1944, genit. slide no. SS1223♀; Setagaya-ku, Kinuta, 1♀, 14. VIII. 1961, Y. KUROSAWA leg.; Setagaya-ku, Seijô, 2♂3♀, 19. VII. 1982, genit. slide no. NSMT2372♂, NSMT2366♀, 3♂, 29. VIII. 1981, 1♀, 9. IX. 1981, M. KIMURA leg., Shinjuku-ku, Toyama, 1♂, 19. XI. 1990, N. MONDEN leg.; Itabashi-ku, Akatsuka, 3♂2♀, 22. VIII. 1986, T. TANAKA leg.; Mt. Takaosan, 1♀, 29. VIII. 1967, 1♂, 16. IX. 1967, 1♂, 18–19. IX. 1965, Y. KISHIDA leg., 1♂, 29. IX. 1951, S. SUGI leg., genit. slide no. SS1216♂. Izu Islands: Ôshima Is., Okada, 1♂, 9. X. 1966, H. FUJIWARA leg.; Miyakejima Is., Tsubota, 1♂, 3. X. 1968, T. MAENAMI leg., genit. slide no. NSMT2023♂; Kôzushima Is., 1♀, 26–28. VII. 1965, T. MAENAMI leg., genit. slide no. NSMT2037♀; Mikurajima Is., Nangô, 1♂1♀, 12. VIII. 1987, H. NAKAJIMA leg.; Hachijôjima Is., Mitsune, 1♀, 7. VII. 1967, T. MAENAMI leg. Kanagawa Pref.: Yokosuka, Mt. Ôgusuyama, 1♂, 28. IX. 1990, H. KOBAYASHI leg. Aichi Pref.: Seto, Kaisho, 1♂, 10. X. 1995, S. FUNAKOSHI leg. Gifu Pref.: Gifu, Mitahora, 1♂, em. 12. VI. 1985, 1♂, em. 7. VII. 1985, 1♀, 29. IX, 1981, S. FUNAKOSHI leg. Mie Pref.: 2♀, same data as holotype. Wakayama Pref.: Wakayama, Uchihara, 1♀, em. 19. VI. 1992, ex *Photinia glabra*, Rosaceae, M. MURASE leg.; Arita-gun, Mt. Oishiyama, 1♀, 3. VIII. 1985, I. MATOBA leg.; Naka-gun, Kishikawa, Takao, 1♂, 29. VII. 1986, I. MATOBA leg.; Tanabe, Tenjinzaki, 1♂, 24. VII. 1981, S. GOTO leg.; Higashi-Muro-gun, Taiji, 1♂, 30. VII. 1971, S. NAKATANI leg.; Higashi-Muro-gun, Mt. Ôtôsan, Ôsugidani, 1♂, 23. IX. 1973, S. NAKATANI leg. Sadogashima Island: Hakuundai 1,000 m, 1♂, 1. VIII. 1989, H, KOBAYASHI leg. Oki Islands: Dôgo Is., Chôshigawa Riv. 200 m, 3♂, 15, 18. IX. 1993, M. OWADA leg., genit. slide no. NSMT2371♂; Dôgo Is., Dankyô-no-taki 400 m, 15♂12♀, 16. IX. 1993, M. OWADA leg., genit. slide nos. NSMT2367♀, 2370♀. Shimane Pref.: Hamada, Ichinose, 1♀, 6. IX. 1963, T. FUJIMURA leg., genit. slide no.


Holo-type
Ex Musaeo Ach. Guenée
Ex Oberthür Coll. Brit. Mus. 1927—3.
4. Amph. Monolitha Gn.
Spec. 1279.
Vu par Stgr pour catal. 190.
1
2
Type
Japan
705
Surnia n.
Rothschild Bequest B.M.1939-1.
3

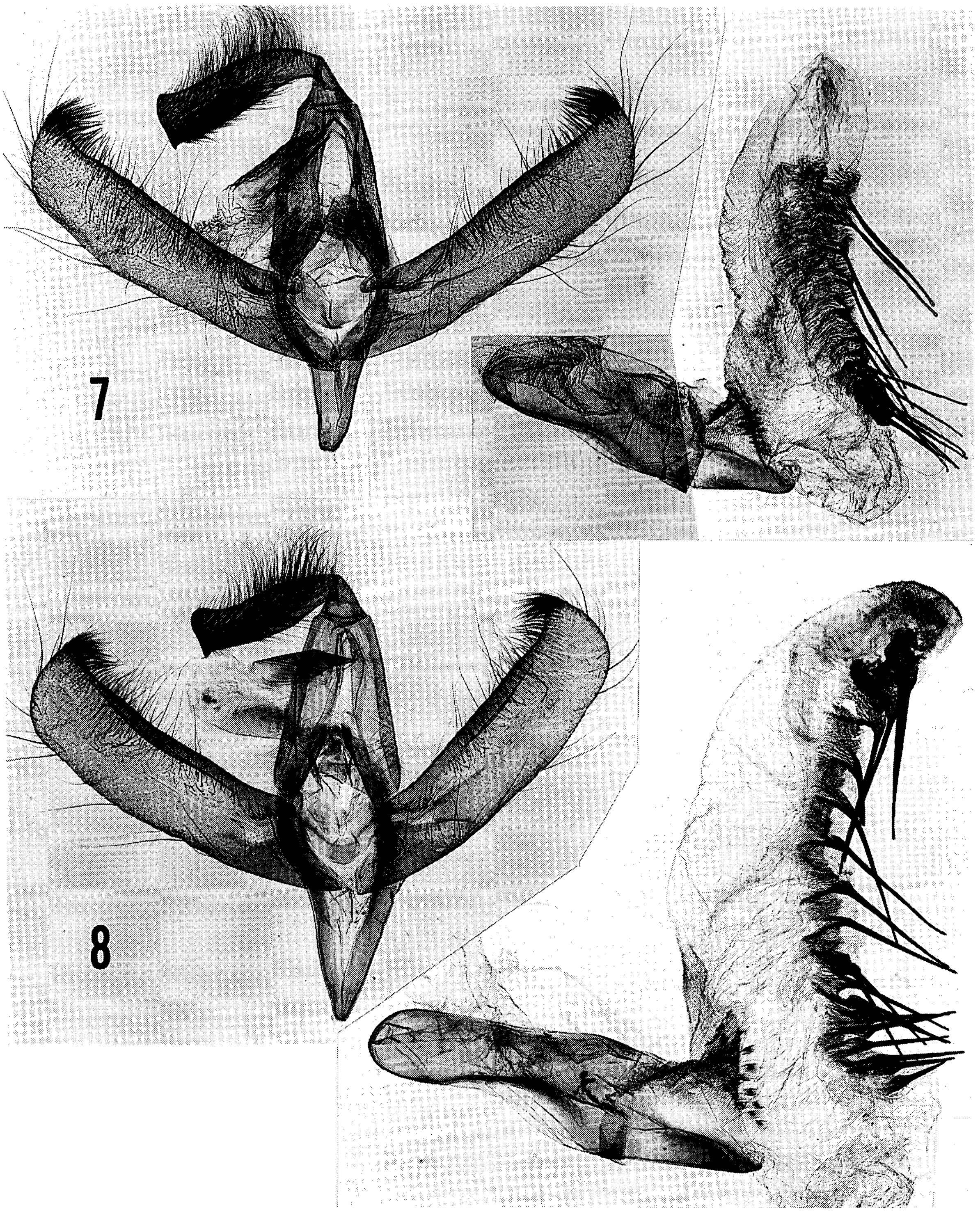
Figs. 1–3. Specimens of the *Amphipyra pyramidea* complex in the Natural History Museum, London. 1. Holotype ♂ of *A. monolitha* GUENÉE, and its labels. 2. *A. monolitha* ♂, Shilong, Assam, VI. 1893. 3. Lectotype ♂ of *A. surnia* FELDER et ROGENHOFER, and its labels. Pin scale: ca. 10 mm.

NSMT2029♀. Fukuoka Pref.: Kurisaki, 1♂, 24. VIII. 1924; Fukuoka, 1♂, 3. VII. 1924, H. HORI leg.; Fukuoka, Hirao, 1♂, 2. VIII. 1929, T. ESAKI *et al.* leg., 2♂, 5. X. 1929, H. HORI *et al.* leg., 1 ♂, 18. X. 1930, T. ESAKI *et al.* leg.; Sasaguri, Mt. Wakasugiyama, 1♂, 25. VII. 1966, 1♂, 2. X. 1965; Kashii, Kusaba-kôsen, 4♂1♀, 26–27. VII. 1935, T. ESAKI *et al.* leg. Miyazaki Pref.: Suki-son, Kirei-tôge 800 m, 3♂, 6. IX. 1992, M. OWADA leg. Yakushima Island: Miyanoura, 1♂1♀, 27. VII. 1972, T. WATANABE leg.; Miyanoura, Shiratani 400–600 m, 1♂, 1–3. VII. 1994, 2♂, 14–16. X. 1993, M. OWADA leg.; Shiratani, 2♂, 15. IX. 1972, T. WATANABE leg.; Nagata, 2♂2♀, 15. VII. 1972, T. WATANABE leg.; Mt. Shichigodake, 1♂, 2. VIII. 1974, T. WATANABE leg. Ryukyu Islands: Tokara Group, Nakanoshima Is., Sokonashinuma 260 m, 2♂, 16. VI. 1993, M. OWADA leg.; Amami-ôshima Is., Uken, Mt. Yuwandake 460 m, 5♂6♀, 21, XI. 1987, M. OWADA & K. HORIE leg., genit slide nos.



Figs. 4–6. Japanese species of the *A. pyramidea* complex. 4. Holotype ♀ of *A. horiei* Owada, sp. nov. 5. *A. monolitha* ♂, Miyama, Mie Pref., 11. VIII. 1992. 6. *A. pyramidea* ♂, Takine, Fukushima Pref., 18. VII. 1995. Pin scale: ca. 10 mm.

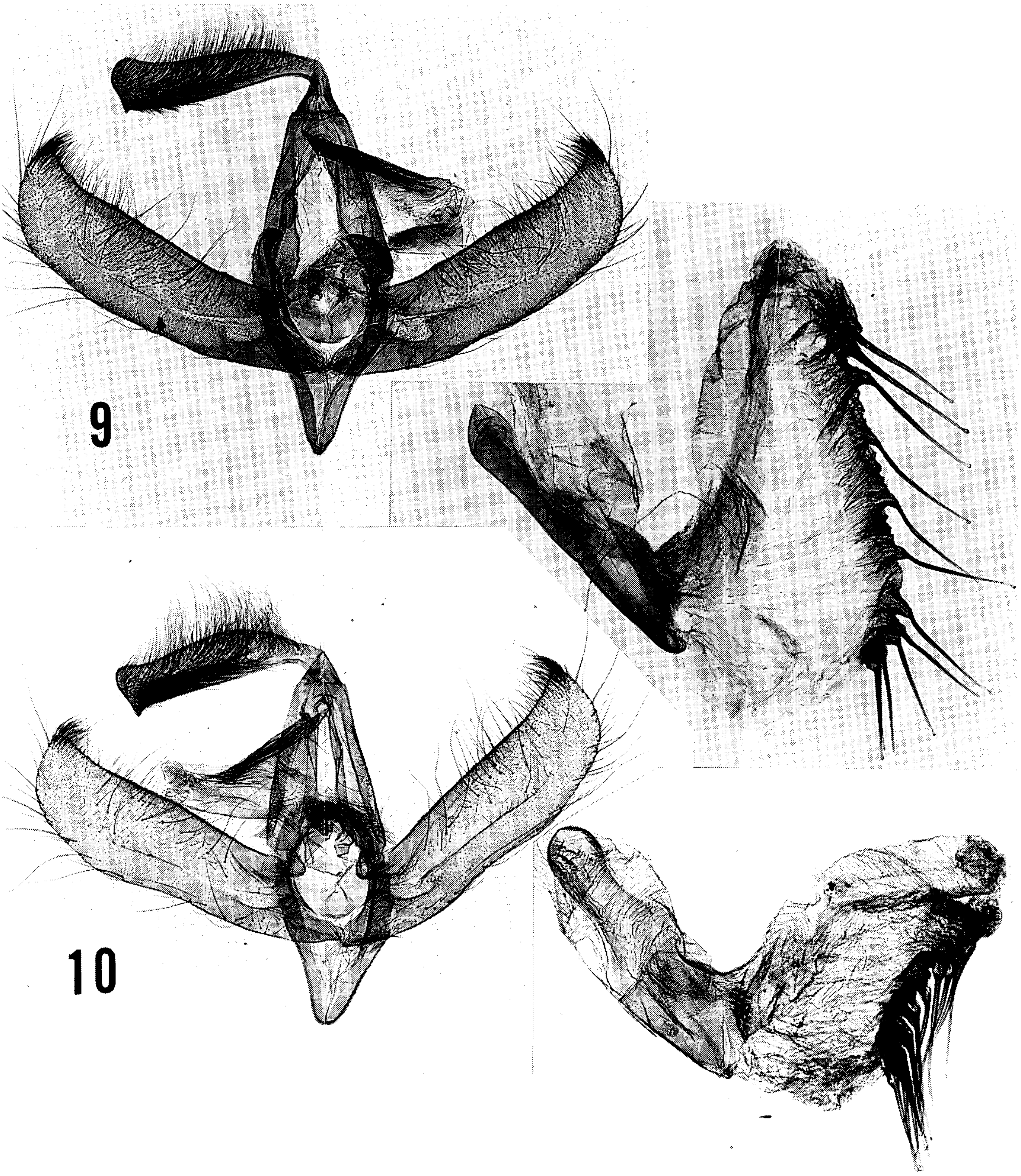
NSMT 2012♂, 2022♂, 2026♀, 2373♀; Amami-ôshima Is., Mt. Yuwandake, 1♀, 9–11. VIII. 1977, A. Seino leg.; Amami-ôshima Is., Setouchi, Katsuura 400 m, 1♀, 22. XI. 1987, M. Owada leg.; Amami-ôshima Is., Setouchi, 2♀, 24. VI. 1988, M. Tanida leg., genit. slide no. NSMT2369♀; Amami-ôshima Is., Uragami, 1♀, 10. XII. 1968, Y. Sekiguchi leg.; Amami-ôshima Is., Sumiyougawa Riv. 240 m, 1♀, 13–14. I. 1991, M. Owada leg.; Tokunoshima Is., Mikyô 150 m, 2♂, 31. X–1. XI. 1992, M. Owada leg.; Okinawa Is., Kunigami, Aha, 1♂, 20. VII. 1995, M. Kimura leg. In the collections of the National Science Museum, Tokyo, Wakayama Prefectural Museum of Natural History, Kainan, Entomological Laboratory, Kyushu University, Fukuoka, the Natural History Museum, London, Zoologisches Forschungsinstitut u. Museum A. Koenig, Bonn, and in the



Figs. 7–8. Male genitalia. 7. *A. horiei*, Oki, Shimane Pref., genit. slide no. NSMT2371♂. 8. *A. monolitha surnia*, Alishan, Taiwan, genit. slide no. NSMT2383♂.

following personal collections: S. Funakoshi, Hozumi, Gifu, M. Kimura, Naha, Y. Kishida, Tokyo, H. Nakajima, Yokohama, A. Seino, Suibara, Niigata, S. Sugi, Tokyo, T. Tanaka, Tokyo.

Distribution (Fig. 20). Japan: Pacific side of central and western Honshu, Izu Islands; Sadogashima Island, Oki Islands and Chûgoku District; Kyushu, Yakushima Island; Ryukyu Islands

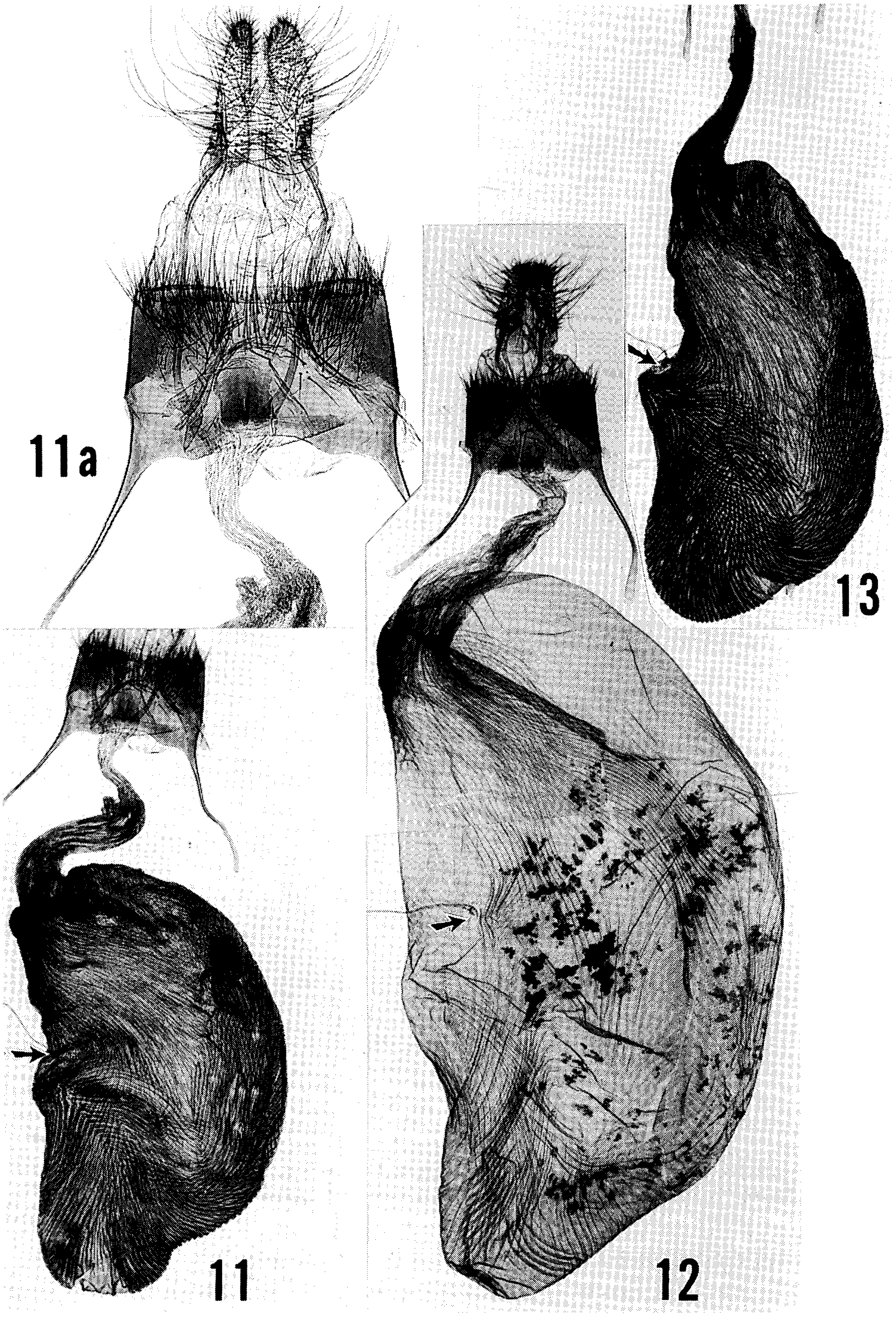


Figs. 9–10. Male genitalia of *A. pyramidea*. 9. *A. pyramidea yama*, Mt. Zaô, Miyagi Pref., genit. slide no. NSMT2014♂. 10. *A. pyramidea obscura*, lectotype of *A. acheron* Draudt.

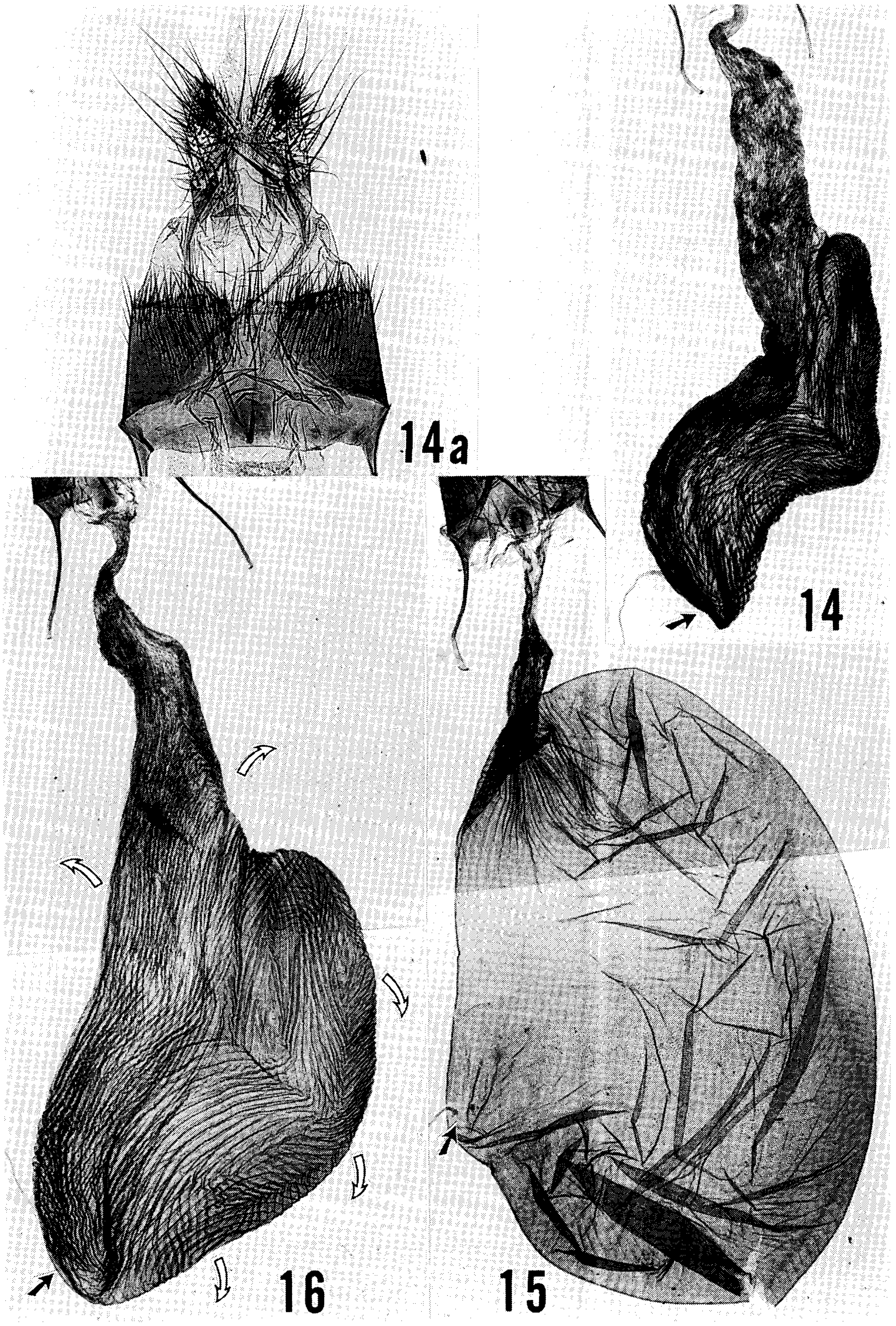
(Nakanoshima Is., Amami-ôshima Is., Tokunoshima Is. and Okinawa Is.).

Diagnosis and discussion. Amphipyra horiei is readily discriminated from the other members of the *A. pyramidea* complex by the absence of the vertical black and white stripes at the lateral sides of the abdomen. Besides this clear-cut feature, this species is characterized by the following external characters in comparison with the Japanese forms of *A. monolitha* and *A. pyramidea*.

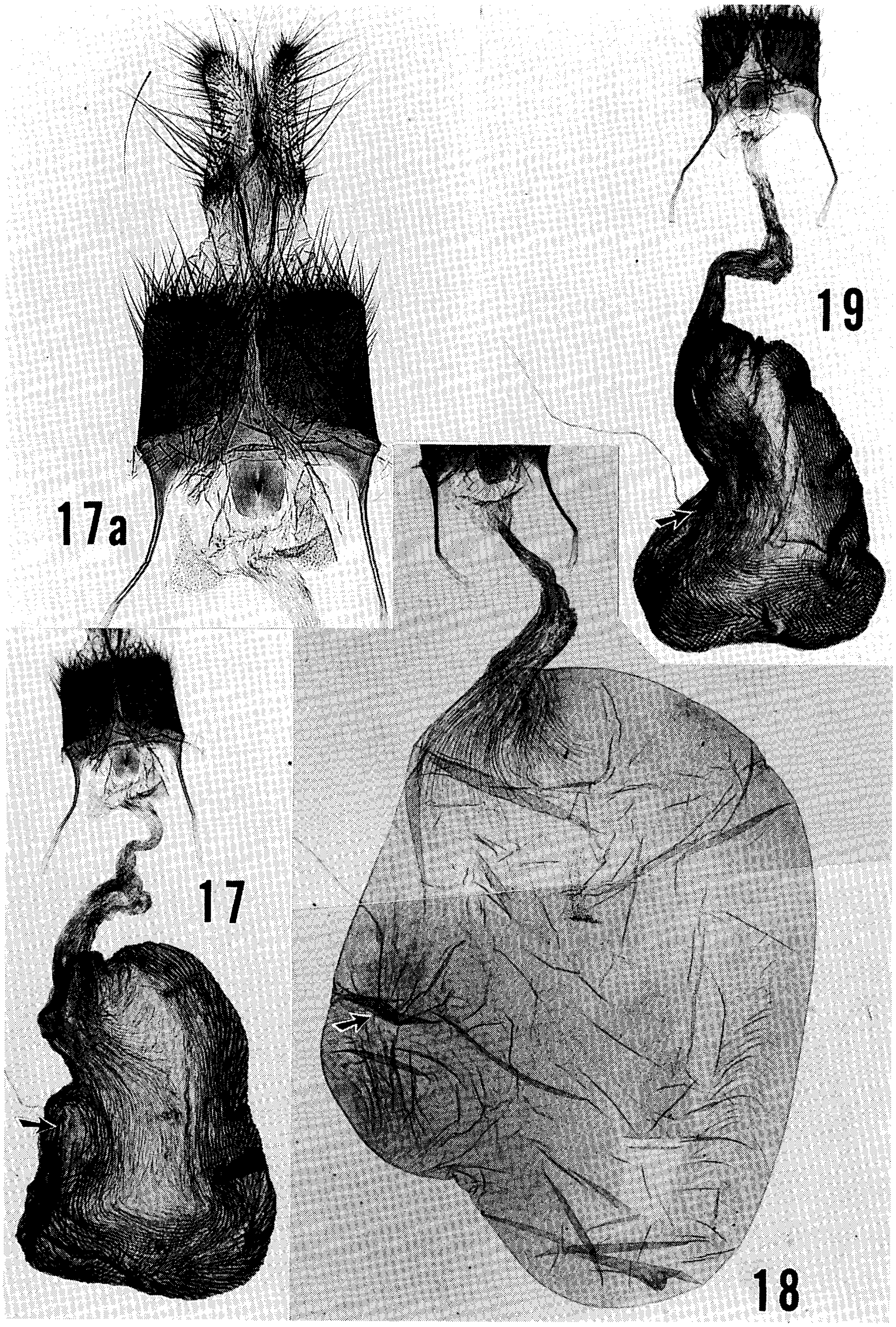
Amphipyra horiei and *monolitha* is almost identical in size (length of forewing: 26–32 mm), while



Figs. 11–13. Female genitalia of *A. horiei*. 11. Oki, Shimane Pref., genit. slide no. 2367♀, virgin, 11a, papillae anales and 8th segment, magnified. 12. Amami-ôshima Is., Ryukyus, genit slide no. NSMT 2373♀, after copulation. 13. Same locality, genit slide no. NSMT2369♀, virgin. Arrow: arising point of ductus seminalis.



Figs. 14–16. Female genitalia of *A. monolitha surnia*. 14. Miyama, Mie Pref., genit. slide no. NSMT 2375♀, virgin, 14a, papillae anales and 8th segment, magnified. 15. Mt. Akiba, Niigata Pref., genit. slide no. NSMT2376♀, after copulation. 16. Ssuleng, Taiwan, genit. slide no. NSMT2378♀, intermediate state of bursa, white arrows showing the spreading direction of bursa.



Figs. 17–19. Female genitalia of *A. pyramidea*. 17. Kashima, Fukushima Pref., genit. slide no. NSMT 2381♀, virgin, 17a, papillae anales and 8th segment, magnified. 18. Chûgû Spa, Ishikawa Pref., genit. slide no. NSMT2384♀, after copulation. 19. Tayuling, Taiwan, genit. slide no. NSMT2380 ♀, virgin.

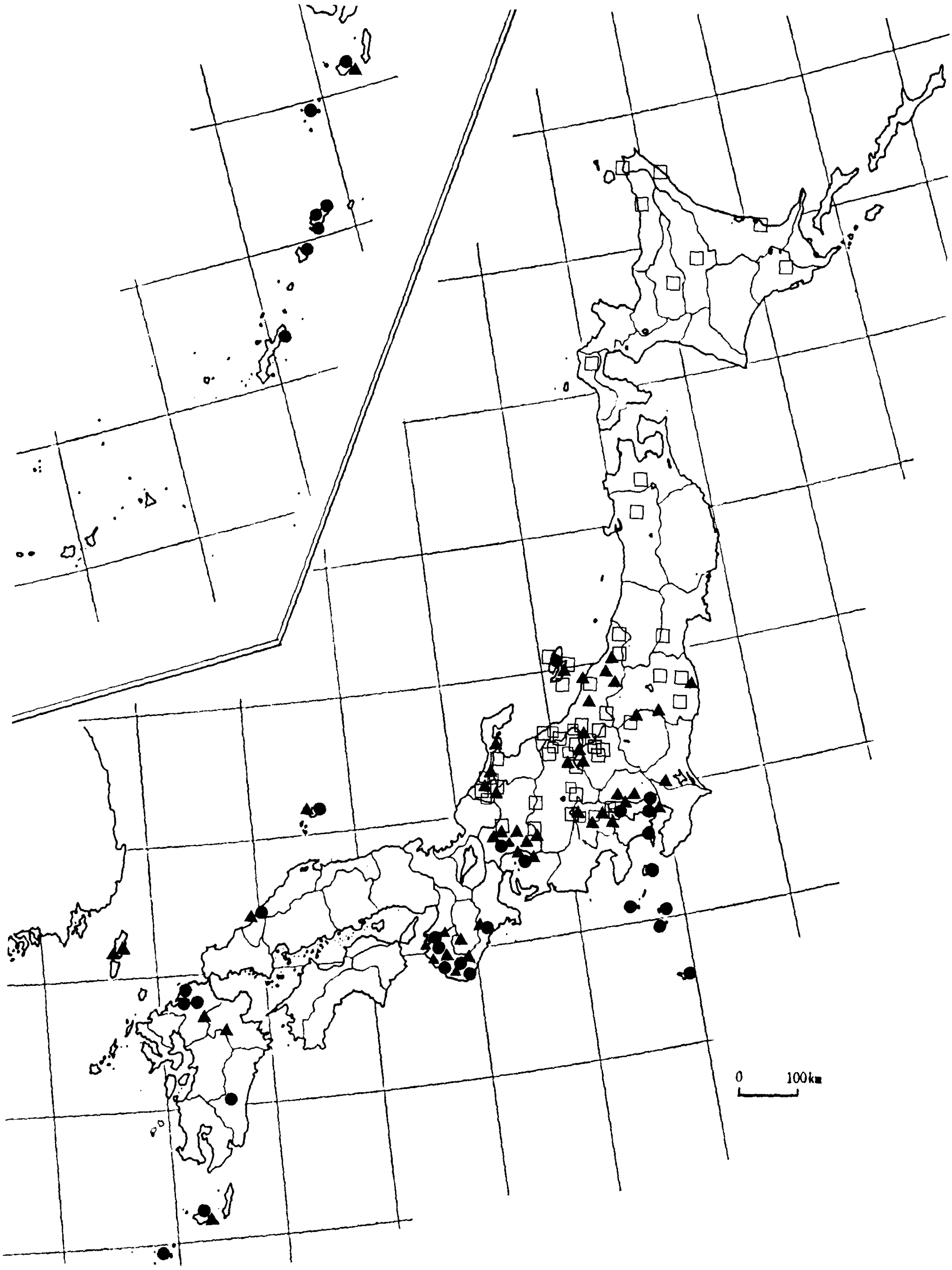


Fig. 20. Distribution map of the *Amphipyra pyramidea* complex in Japan, based on the specimens examined in this study. Circle: *A. horiei*; triangle: *A. monolitha surnia*; square: *A. pyramidea yama.*

pyramidea is smaller (length of forewing: 22–28 mm), and the forewings of the former two species are somewhat broader than that of the latter. In *horiei*, the ground colour on the upperside of forewing is much more tinged with dark reddish brown. In *pyramidea*, it is more tinged with pale greyish brown. In *monolitha*, it is similar to that of *horiei*, but rather pale. The copper reddish brown ground colour of hindwing is deepest in *horiei*, similar or a little paler in *monolitha*, and is tinged with grey in *pyramidea*. The orbicular stigma of *horiei* consists of a black ovate circle filled with ochreous silver which usually does not contain a central black dot. On the other hand, the central black dot of orbicular stigma is always present and conspicuous in *pyramidea* and *monolitha*, except some unusual specimens. In *monolitha* and *pyramidea*, the underside of abdomen is pale ochre and the 7th segment has a pair of triangular black shades which continue to the lateral black marks, and the contrast of the pale and dark parts is strong, while in *horiei* it is ochreous brown with a blackish brown anal tuft, and the contrast is not so strong.

The holotype of *Amphipyra monolitha* GUENÉE, 1852 (Fig. 1) lost the abdomen for dissection of the genitalia, and the orbicular stigma is rather small and has no central black dot. In the holotype of *Amphipyra surnia* FELDER et ROGENHOFER, 1874, (Fig. 3), the orbicular stigma has not central black dot as in the holotype of *A. monolitha*, and the underside of abdomen is of the typical coloration described under *monolitha* in this paper. According to FLETCHER (1968), two subspecies of *A. monolitha* are recognized, *e.g.*, *A. m. monolitha* from Assam to the western Himalayas, and *A. monolitha surnia* from China, Korea and Japan. The ground colour and the underside of abdomen of the nominotypical subspecies is darker than those of subsp. *surnia*, and the lateral black and white stripes of the abdomen are present (Fig. 2). Chang (1991) recorded *A. monolitha surnia* from mountains of Taiwan, and illustrated three specimens in which the abdomen bears the lateral black and white stripes. I have also examined 4♂6♀ of Taiwanese *monolitha* but failed in finding *A. horiei* from Taiwan.

In the male genitalia, it is very difficult to find features diagnostic between *monolitha* and *horiei*. The shape of the uncus of *pyramidea* is a little different from those of *monolitha* and *horiei*, *e.g.*, the dorso-distal portion of the uncus is distally protruded in the former, and is dorsally swollen in the latter two. This character was stressed by many authors as a diagnostic feature separating *pyramidea* from "*monolitha*" (SWINHOE, 1918; FLETCHER, 1968; SUGI, 1982; FUNAKOSHI, 1984). The number of cornuti is variable, though there is a tendency to be less in *pyramidea* (OGATA, 1958).

In the female genitalia, *A. horiei* can be clearly distinguished from *monolitha* and *pyramidea*. The setae on the papillae anales and 8th segment are almost the same as in those of *pyramidea*, longer and denser than those of *monolitha*. A few setae are found around the sclerotized lamella postvaginalis in *pyramidea*, but they are absent in *horiei* and *monolitha*. The shape of bursa copulatrix is different from each other, if they are separated in virgin and copulated ones. In the virgin females which are collected in the summer, the bursa copulatrix is flattened and heavily furrowed. In *horiei* (Figs. 11, 13), the bursa consists of a slender neck and a broad bursa; the neck is rather long; the bursa is smoothly rounded in the right side; at the left side it is nearly straight and has a little collapsed portion at the middle from which the ductus seminalis arises (see arrow), and the bottom of bursa is tapered. In *pyramidea* (Figs. 17, 19), the bursa is rather similar to that of *horiei*; the neck is a little shorter; the bottom of bursa is broadened, and the ductus seminalis arises at the middle of the left side of the bursa (see arrow). In *monolitha* (Fig. 14), the slender neck is very short and is connected with rather broad part of bursa; the bursa is sinuate, the posterior portion is rather slender, the right side is rectangularly swollen, and the bottom of bursa is acutely tapered; the ductus seminalis arises from the apex of the bottom (see arrow).

After copulation which is carried out late in the autumn, the bursa copulatrix is expanded (furrows disappear) and the shape is quite different from that in the virgin one. In *horiei* (Fig. 12), the slender neck is short; the bursa is rather long ovate with a rather tapered bottom, the right side is smoothly rounded, and the left side is almost straight; the ductus seminalis arises at the middle of the left side (see arrow). In *pyramidea* (Fig. 18), the slender neck is rather long; the bursa is nearly round and somewhat protruded at 2/3 of the right side and at 1/3 of the left side, respectively; the ductus seminalis arises from the protrusion on the left side (see arrow). In *monolitha* (Fig. 15), the slender neck is as long as that of *horiei*; the bursa is ovate, smoothly rounded on both sides, and the bottom is also rounded and not so tapered as in *horiei*; the ductus seminalis arises at the middle of the left side (see arrow). In a female *monolitha* collected in Taiwan on November 22nd, 1995, the bursa (Fig. 16) is not completely expanded, the furrows are still present, and the arising point of the ductus seminalis is also at the bottom, but the bursa is expanded to some extent. This state of the bursa copulatrix suggests the spreading direction of the bursa which is shown in white arrows in Fig. 16, and is considered to be one of the evidence of multiple copulation in *monolitha* and the allied species which emerge in the early summer, then estivate, and then copulate and lay eggs in the late autumn (SUGI, 1982; OWADA, 1988; FUNAKOSHI, 1992).

The distributional range of *A. horiei* seems to mostly overlap that of *A. monolitha* in Japan, and does not overlap that of *A. pyramidea* except in Sadogashima Island where these three species were collected (Fig. 20). In the Ryukyu Islands, *A. horiei* is distributed from Okinawa Is. to Nakanoshima Is., where *A. monolitha* has not hitherto been collected. On Yakushima Is., the two species, *horiei* and *monolitha*, were obtained, and in the Izu Islands only *A. horiei* has been collected. They are common from Kyushu through the Pacific side of Honshu to the Kantô District. In Tsushima, *A. monolitha* is common, but *A. horiei* has not been collected yet. However, the two species were collected in the Oki Islands and Sadogashima Island on the Sea of Japan, and *A. pyramidea* was collected in the latter island. The northern limit of the distributional range of *A. monolitha* is the Tôhoku District, northeastern Honshu, and the ranges of *A. monolitha* and *A. pyramidea* overlap in central and northeastern Honshu. *Amphipyra pyramidea* is common in Hokkaido and in northeastern and central Honshu, but the southern and western limits of its range are not clear, and this species has not been collected in Kyushu and Shikoku at least (SUGI, 1982). The western limit of the range of *pyramidea*, based on the specimens examined in the course of this study, is Ishikawa Prefecture on the side of the Sea of Japan and is Gifu Prefecture on the Pacific side. FUNAKOSHI (1992) reported the female mating frequency of 7 species of *Amphipyra* moths collected on a hill (200 m in altitude) near Gifu City, and *A. pyramidea* was included among them. Therefore, Gifu City may be the southwestern limit of the range of *pyramidea*.

Geographical Variations of *Amphipyra pyramidea*

FLETCHER (1968) revised geographical forms of *Amphipyra pyramidea* and recognized three subspecies: *A. p. pyramidea* from Europe, *A. pyramidea cuprior* FLETCHER, 1968, from the Mediterranean, and *A. pyramidea obscura* OBERTHÜR, 1880, from Southeast Siberia, Manchuria and the Little Chingan Mts. (Northeast China), and the Kuriles. Although he did not include the populations from Korea and Japan directly in the range of the subspecies *obscura*, he tentatively treated them as "the more brightly coloured southern form of subsp. *obscura* from Korea and Japan". SUGI (1982) synonymized the nominal taxon of the Japanese representative, *A. yama* SWINHOE, 1912, with subsp. *obscura*, on the basis of a personal correspondence from Mr. D. S. FLETCHER to Dr. H. INOUE. However, as was stressed by FLETCHER (1968), they are quite different in the hindwing coloration, that is, subsp. *obscura* has "a hindwing of a smoky brown appearance, the pale copper ground colour is varyingly suffused with cocoa brown", and the Japanese specimens have "the hindwings more brightly copper-coloured".

On the other hand, more dark coloured specimens are collected from the southern part of East Asia. CHANG (1992) illustrated this form from Taiwan under the name of *A. acheron* DRAUDT, 1950. As was discussed in the present paper, *Amphipyra pyramidea* can be clearly separated from the other members of the *pyramidea*-complex not only by the shape of the uncus but also by the shape of the female genitalia, and the Taiwanese representative doubtlessly belongs to this species (Fig. 19). Through the courtesy of Dr. D. STÜNING, Zoologisches Forschungsinstitut u. Museum A. Koenig, Bonn, and Mr. H. YOSHIMOTO, Tanashi, I was able to examine the type specimens of *A. acheron*, and found that *A. acheron* was also considered to be the same as *A. pyramidea.* Recently YOSHIMOTO (1994) described *Amphipyra suryai* from eastern Nepal, and stated that "the male genitalia are hardly separable from those of *pyramidea*". This form has an uniformly fuscous grey forewing and a coppery orange brown hindwing. In the collection of National Science Museum, Tokyo, there are 12 specimens of *A. pyramidea* from western Nepal, and their wing maculation is almost identical with that from northwestern India described by FLETCHER (1968). Judging from these varieties of forms in the southern and eastern parts of Asia, it can be surmised that in the eastern part of the Asian Continent *A. pyramidea* is markedly tinged with fuscous especially in the hindwing, and in the southern side of the Himalayas the moth is rather similar to those from the Mediterranean and from Japan, because of the coppery hindwing.

In this paper, I will propose the subspecies classification of *Amphipyra pyramidea* from southern and eastern Asia as given in the following lines.

Amphipyra pyramidea yama SWINHOE, stat. nov.

Amphipyra yama SWINHOE, 1918, Ann. Mag. nat. Hist., (9), **2**: 67, pl. 9, fig. 13.

Amphipyra monolitha apyra BRYK, 1942, Dt. ent. Z., Iris, **65**: 47–48. **Syn. nov.**

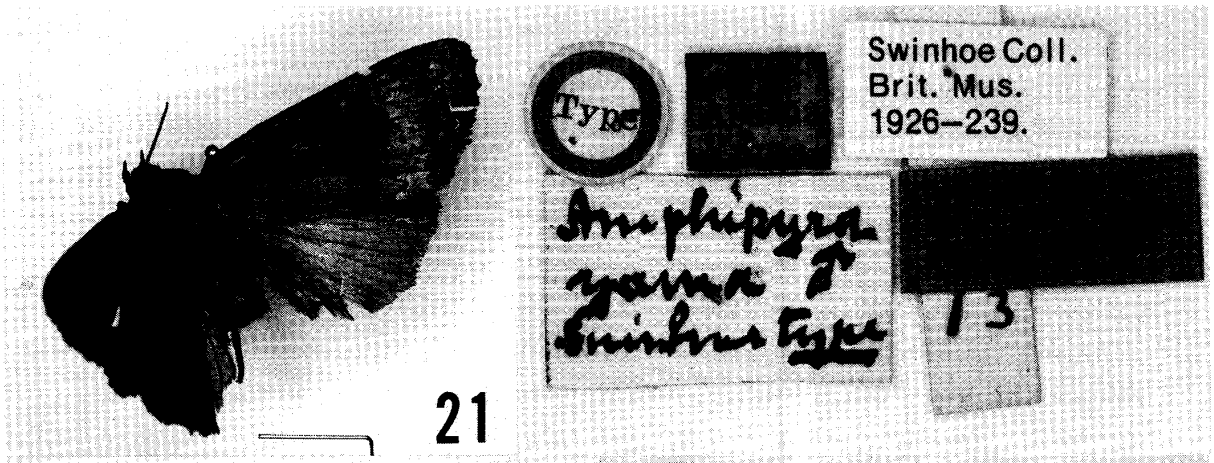
Amphipyra pyramidea obscura: FLETCHER, 1968, Entomologist's Gazette, **19**: 100–101, part, synonymy of *apyra* BRYK; SUGI, 1982, Moths Japan, **1**: 769, synonymy of *yama* SWINHOE, **2**: pl. 189, figs. 1–3, pl. 367, fig. 15 (male genitalia).

Type series. Lectotype of *Amphipyra yama* SWINHOE, male (Fig. 21), designated herein, in the Natural History Museum, London.

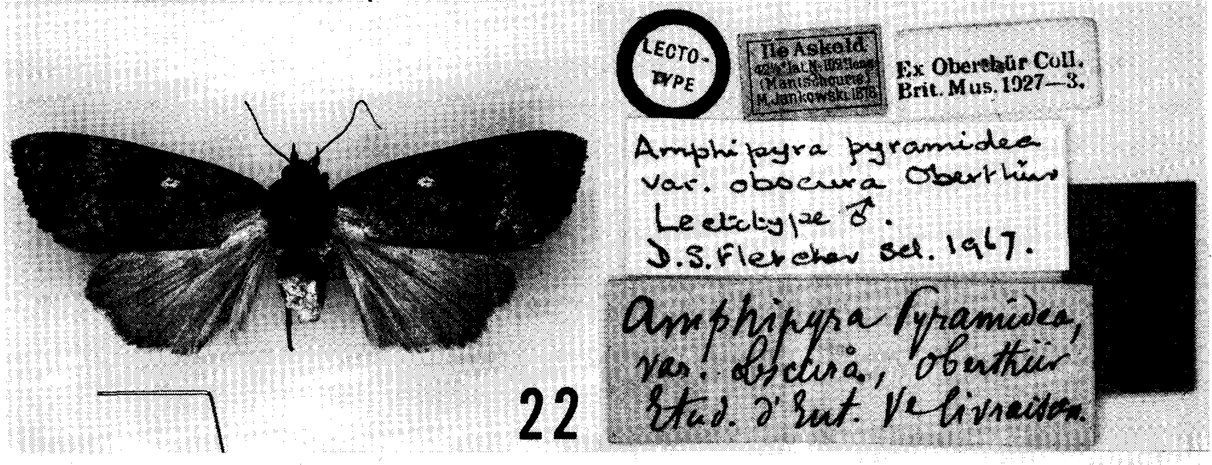
Distribution. Japan (Honshu, Hokkaido and S. Kuriles) and Korea.

Remarks. This subspecies is characterized by the rather elongated forewing and the copper coloured hindwing with a fuscous costal portion. The Korean specimens are rather small and have a rather short and broad forewing than those from Japan. In the original description, BRYK (1942) compared *A. monolitha apyra* with the form *obscura* and stated that "Hinterflügel vorne dunkler vom übrigen Teile abgehoben".

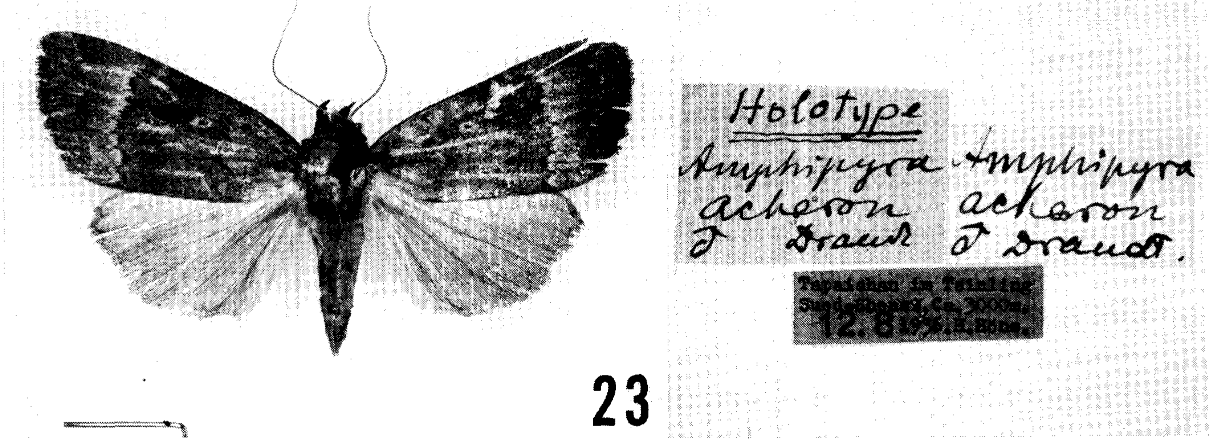
Material examined. Japan: 159 exs., the localities are shown in Fig. 20. Korea: Mt. Pektusan,


Type
Swinhoe Coll. Brit. Mus. 1926–239.
Amphipyra yama ♂ Swinhoe type
73

21


LECTO-TYPE
Ile Askold
Ex Oberthür Coll. Brit. Mus. 1927—3.
Amphipyra pyramidea var. obscura Oberthür Lectotype ♂. D.S. Fletcher sel. 1967.
Amphipyra Pyramidea, var. obscura, Oberthür Etud. d'Ent. Ve livraison.

22



23

Figs. 21–23. Type specimens and their labels of *A. pyramidea* subspecies. 21. Lectotype ♂ of *A. yama* SWINHOE. 22. Lectotype ♂ of *A. obscura* OBERTHÜR. 23. Lectotype ♂ of *A. acheron* DRAUDT. Pin scale: ca. 10 mm.

before Sam-zi-yan Hotel, Lake-shore, 1♂, 19. VII. 1977, DELY & DRASKOVITS leg.; Hamgyongnam-do, Pujongowon, Songhung 400 m, 31. VII. 1934, S. ASAHINA leg.; Gang-von (=Kangwon-do), Kumgang-san, 1♂, 9-11. VII. 1977, DELY & DRASKOVITS leg.; Gang-von, Kumgang-san, near Hotel Go-song 250 m, 1♂1♀, 6–7. VIII. 1975, PAPP & VOJNITS leg.

Amphipyra pyramidea obscura OBERTHÜR

Amphipyra pyramidea obscura OBERTHÜR, 1880, Études Ent., 5: 85; FLETCHER, 1968, Entomologist's Gazette, 19: 100–101, part, designation of the lectotype of *A. pyramidea obscura.*

Amphipyra pyramidea var. *obliquilimbata* GRAESER, [1889] 1888, Berl. ent. Z., 32: 352.

Amphipyra acheron DRAUDT, 1950, Mitt. münch. ent. Ges., 40: 84–85, pl. 6, fig. 5. **Syn. nov.**

Type series. Lectotype of *Amphipyra pyramidea obscura* OBERTHÜR, male (Fig. 22), preserved in the Natural History Museum, London. Lectotype of *Amphipyra acheron* DRAUDT, male (Figs. 10, 23), designated herein, preserved in Zoologisches Forschungsinstitut u. Museum A. Koenig, Bonn.

Distribution. Russia (SE Siberia), Korea (Mt. Sorak-san), Taiwan and China.

Remarks. The type series of *A. pyramidea obliquilimbata* GRAESER has not been located (FLETCHER, 1968), and the type area is Amurland, SE Siberia of Russia.

This subspecies is characterized by the elongated forewing and the uniformly fuscous hindwing. The maculation of forewing is clear in the specimens from SE Siberia and Taiwan (form *obscura*), and is obscure in those from China (form *acheron*). I have examined a typical specimen of the form *acheron* collected on Mt. Sorak-san, Korea. Further study is needed for the habitat segregation of the forms *yama, obscura* and *acheron* in the Korean Peninsula.

Material examined. Taiwan: Taichung, Mt. Hsuehshan, Chika-shanchuang 2,460 m, 2♂, 13. VIII. 1990, M. OWADA leg., genit. slide no. NSMT2379♂; Taichung, Lishan, 1♂, 21–22. VII. 1968, H. FUKUDA leg., genit. slide no. SS1505♂; Hualien, Tayuling 2,600 m, 1♂, 1–3. VII. 1973, M. OWADA leg., 4♂3♀, 23–26. VII. 1981, A. SEINO leg., genit. slide nos. NSMT2374♀, 2380♀, 3♀, 17–18. X. 1977, H. ENDO leg.; Nantou, Mt. Nengkaoshan, Tienchi 2,860 m, 1♂, 21. VI. 1989, M. OWADA leg.; Chiayi, Alishan 2,200 m, 1♀, 9–11. VII. 1964, H. INOUE. Korea: Kwangwon-do, Mt. Sorak-san, 1♂, 13. VIII. 1977, genit. slide no. NSMT2036♂.

Amphipyra pyramidea suryai YOSHIMOTO, stat. nov.

Amphipyra suryai YOSHIMOTO, 1994, Tinea, 14 (Suppl. 1): 116, fig. 515 male genitalia, pl. 85, fig. 20 (holotype).

Distribution. Nepal (Janakpur and Karnali), NW India (Kashmir and Punjab).

Remarks. YOSHIMOTO (1994) described *A. suryai* on the basis of a single male specimen collected at Jili, Janakpur, eastern Nepal. The specimen has a copper hindwing which is similar to that of subspp. *pyramidea, cuprior* and *yama*, but the forewing is uniformly dark fuscous with obscure lines. As was mentioned by FLETCHER (1968), on the other hand, several specimens which look closely similar to the more brightly coloured southern form of subsp. *obscura* were collected in the southwestern part of the Himalayas, and I had collected similar specimens in the Karnali Zone, western Nepal. Although FLETCHER (1968) tentatively included this form in the subsp. *obscura*, the Southwest Himalayan form is rather similar to the Mediterranean subsp. *cuprior* FLETCHER, 1968. It is very interesting that the East Himalayan specimen has a forewing somewhat similar to that of *acheron* from W. China. Thus, the Himalayan form of *A. pyramidea* is characterized by the intermediate maculation between the subspp. *cupurior* and *obscura*, *e.g.*, the hindwing is copper reddish brown and the coloration of rather broad forewing varies from the obscure one of *acheron* (=*obscure*) to the clear one of *cuprior*. Therefore, the valid subspecific name is *suryai* YOSHIMOTO, 1994.

Material examined. W. Nepal, Karnali: Ghughuti 2,660 m, 1♀, 21. IX. 1981, M. OWADA leg.; Neurgar 2,800 m, 1♂2♀, 22. IX. 1981, M. OWADA leg., genit. slide nos. NSMT2015♂, 2032♀; Bhulbhule 3,270 m, 1♀. 23. IX. 1981, M. OWADA leg.; Chuchumara Dara 3,600 m, 1♀, 27. IX. 1981, M. OWADA leg., genit. slide no. NSMT2033♀; Jillya 2,690 m, 5♂1♀, 29. IX. 1981, M. OWADA leg.

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要約

シマカラスヨトウ ***Amphipyra pyramidea***（チョウ目，ヤガ科）は，ヨーロッパから日本までの温帯域に広く分布する種で，このほか近似種が数種知られているが，同定はかなり難しい．日本にはもう1種，オオシマカラスヨトウ ***Amphipyra monolitha*** が分布するとされていた．私はそのオオシマカラスヨトウに2種が含まれていることに気付き，この種群の再検討を行った．これまでに命名されたタクサの基準標本を調べたが，新たに発見した種に含まれるものはなく，この論文で新種ナンカイカラスヨトウ ***Amphipyra horiei*** OWADA, 1996，として命名記載した．シマカラスヨトウとオオシマカラスヨトウの腹部側面には，黒と白の明瞭な縞模様があるのだが，ナンカイカラスヨトウにはこの斑紋がないので同定は容易にできる．雄交尾器ではシマカラスヨトウの uncus が他の2種のものと異なるほかは，明瞭な区別点が発見できない (Figs. 7–10)．一方，雌交尾器ではこれら3種は明瞭に区別できるが，交尾前と交尾後では，交尾嚢の形が大幅に異なるので注意を要する (Figs. 11–19)．ナンカイカラスヨトウは沖縄島を南限とし，琉球列島から九州，太平洋岸では紀伊半島から東海地方を経て伊豆諸島と東京周辺まで，日本海側は隠岐と佐渡島に分布しており，島根県浜田市でも採集されている．オオシマカラスヨトウは屋久島以北で採集されており，ナンカイカラスヨトウより分布は少し北にかたより，伊豆諸島では採集されていない．シマカラスヨトウは本州中部以北に分布し，西限および南限は，日本海側では石川県，太平洋側では岐阜県であった．本研究で検討した標本に基づいて作成した分布図を Fig. 20 に示した．四国にプロットがないのは標本を実際に検討していないだけで，ナンカイカラスヨトウとオオシマカラスヨトウの両種が分布することは容易に予想される．この研究の過程で，シマカラスヨトウの南および東アジアの亜種について，従来の扱いに問題があることが明らかになったので，次の

ように分けることを提唱した.

Amphipyra pyramidea yama SWINHOE: 分布，本州，北海道，南千島，韓半島.

Amphipyra pyramidea obscura OBERTHÜR: 分布，沿海州，韓半島（雪岳山），台湾，中国.

Amphipyra pyramidea suryai YOSHIMOTO: 分布，ヒマラヤ地方.

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